

CLAIMS

1. A method for fabricating a flip-chip light emitting diode device, the method including:

5 (a) depositing epitaxial layers on a growth substrate to produce an epitaxial wafer;

(b) fabricating a plurality of light emitting diode devices on the epitaxial wafer;

10 (c) dicing the epitaxial wafer to generate at least one separated device die from the epitaxial wafer, said device die including at least one of the plurality of the light emitting diode devices and a portion of the growth substrate;

15 (d) flip chip bonding the device die to a mount, said flip chip bonding including securing the device die to the mount by bonding an electrode of the device die to a bonding pad of the mount; and,

(e) subsequent to step (d), removing at least some of the growth substrate from the device die.

2. The method of claim 1, further comprising:

20 (f) prior to step (e), providing a support material that supports the device die relative to the mount.

3. The method of claim 2, wherein step (f) comprises:

25 providing the support material in a flowable form that contacts the device die and the mount; and,

hardening the support material into a non-flowable form.

4. The method of claim 2, further comprising:

(g) subsequent to step (e), removing the support material.

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5. The method of claim 2, wherein the support material is not electrically active.

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6. The method of claim 1, wherein step (e) comprises:
removing substantially the entire portion of the growth substrate from
the device die.

5 7. The method of claim 6, wherein step (e) comprises:
illuminating the portion of the growth substrate included on the device
die with laser light.

10 8. The method of claim 7, wherein the growth substrate is made of
sapphire and the laser light is ultraviolet laser light.

9. The method of claim 1, wherein step (e) comprises:
removing less than the entire portion of the growth substrate from the
device die.

15 10. The method of claim 9, wherein a thickness of the growth
substrate on the device die subsequent to step (e) is less than the thickness
prior to step (e).